



WHO/CTD/MAL/98.6
Distr. General
Orig. English

TURNING MALARIA AROUND



*World Health Organization
Division of Control
of Tropical Diseases*

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Research and Layout: Brigitte Shidrawi, Ge
Children's faces, courtesy of UNICEF.

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TURNING MALARIA AROUND



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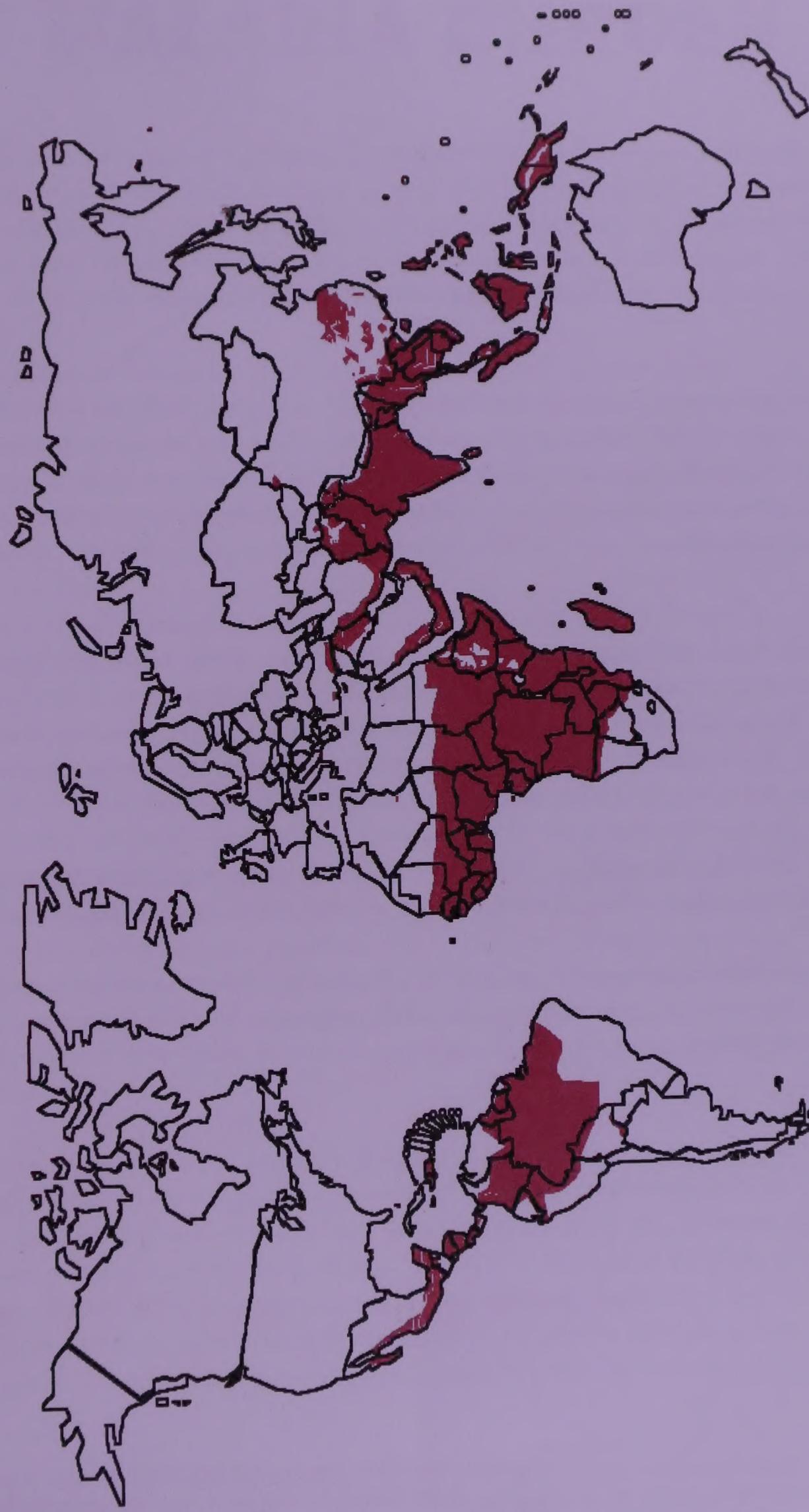
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Mosquito nets, repellents, environmental sanitation and selective and targeted use of insecticides are useful prevention measures.

MALARIA SITUATION 1998



The Transmission Cycle

Malaria is caused by a protozoan parasite that is transmitted by the bite of female *anopheline* mosquitos (vectors). Four parasite species belonging to the genus *Plasmodium* occur in man, of which *Plasmodium falciparum* is the most dangerous and accounts for almost all of the deaths. Carried by blood, all parasites attack the victim's liver and red blood cells, inducing bouts of fever and anaemia.

Malaria can manifest itself widely, from fever and chronic infection complicated by anaemia, to progressive and fatal illness. A mild and uncomplicated malaria illness may be difficult to distinguish from several other diseases that begin with fever. *Plasmodium falciparum* in many parts of the world has developed resistance to one or more antimalarial drugs. Thus the treatment for, and prophylaxis against, malaria may not always be completely effective.

There are more than 60 malaria-transmitting *Anopheles* species. All breed in water. Each species has its preferred breeding grounds, feeding patterns, and resting-places. Many vector species have developed resistance to one or more insecticides. Insecticide resistance is a genetically inherited characteristic that allows an insect to survive a dose of an insecticide that initially would have killed it.

Malaria kills up to 2.7 million people a year and threatens at least 4 out of every 10 persons.

THE MALARIA BURDEN

Malaria has plagued mankind since human settlement created the right conditions for man-mosquito contact. It has daunted the international scientific community and has resisted many attempts to contain it. Today, it is by far the most widespread tropical parasitic disease, threatening at least four out of every ten persons in the world. It is a killer particularly in Sub-Saharan Africa where ninety percent of the world cases and deaths occur. The remaining ten percent are mostly in Asia and Latin America.

There are 1.5 to 2.7 million deaths from the 300 to 500 million cases of malaria that occur in the world every year. Greatest at risk, are children under the age of five. In some African countries, malaria is responsible for nearly one-quarter of all deaths among children of that age. The disease is a major cause of anaemia and of school absenteeism. Outside Africa, children in highly endemic areas in countries such as Papua New Guinea, and Indonesia, for example, also pay a heavy penalty. During epidemics, all age groups are affected.

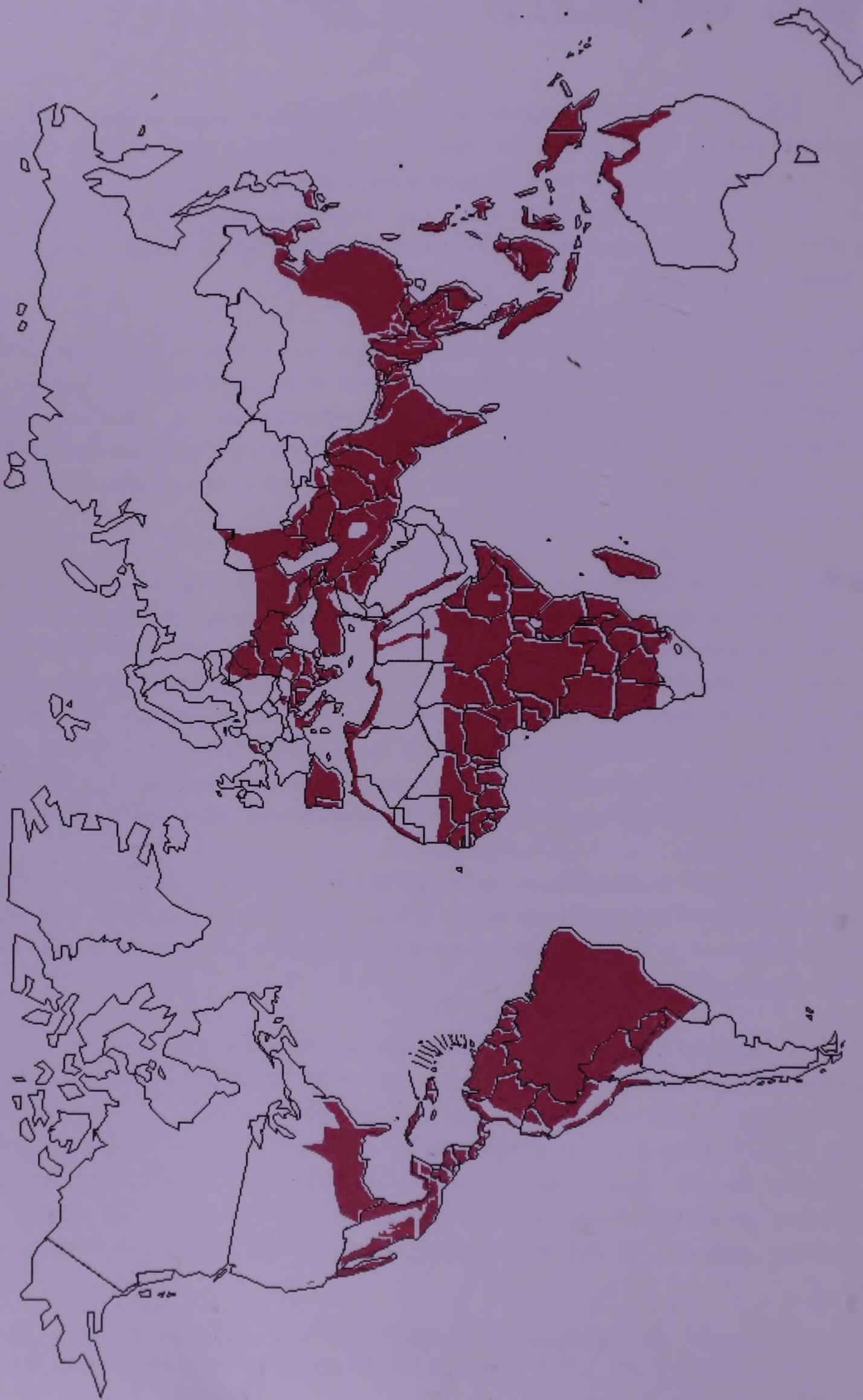
Equally at high risk from malaria, are pregnant women. Malaria in pregnancy can be fatal and can cause, or contribute to, serious problems such as anaemia, miscarriage, premature birth and low birthweight of new-borns. Other risk groups are refugees and migrants pushed from and into malarious areas. Malaria problems are most severe in impoverished areas burdened with war and civil unrest, illegal trade and mass population movements. There were over 20 million refugees in the world in the mid 1990s and about 25 million internally displaced persons forced to leave their homes. Countries where this has happened are those worst affected by malaria, such as Afghanistan, Burundi, Cambodia, Democratic Republic of the Congo, Kenya, Malawi, Rwanda, Somalia, eastern Sudan and Zimbabwe.

Malaria has returned to eastern Europe giving rise for concern. In recent years, malaria transmission has been re-established in Armenia, Azerbaijan, Tajikistan and Uzbekistan, countries from which the disease had disappeared in the 1960s. The risk of malaria outbreaks is increasing and there is a danger of large-scale country-wide epidemics.

Since the Industrial Revolution and the subsequent race to secure natural resources, malaria has evolved into a complex disease recognised as "man-made" or "social" malaria created by the "disturbed" environment. But with and without man's help, malaria impedes social and economic progress. The economic impact in Africa alone, for example, was estimated, in 1997, at US \$2 billion per year. The cycle is vicious. Disease causes ill health resulting in low productivity and poverty and the inability of populations to take preventive action and seek treatment. As Winslow in 1951 put it, men and women get sick because they are poor; they become poorer because they are sick, and sicker because they are poorer.

People at greatest risk are pregnant women, children under five, refugees and displaced persons.

MALARIA SITUATION 1946



STRATEGIES

Malaria is a disease for which specific treatments have been known since antiquity and for which control has never been easy. This is because malaria control is subject to an adaptation to local circumstances that goes beyond other major disease requirements. The appropriate action must be applied through national health systems and communities capable of controlling malaria. But while malaria is complex, it is also preventable and can be cured. If detected early and treated adequately, lives can be saved. The goal of malaria control is, on the one hand, to prevent malaria mortality and reduce morbidity and the socio-economic losses provoked by the disease; and on the other, to maintain the freedom gained in malaria-free areas.

Eradication

Systematic malaria control is said to have started after the discovery of the malaria parasite by Laveran, in 1889, and the demonstration by Ross, in 1897, that the mosquito was the vector of malaria, or carrying the disease. But with the discovery of the powerful insecticidal action of DDT, and the inexpensive antimalarial drug, *chloroquine*, just before World War II, there was hope that worldwide eradication of malaria was possible. From 1955 to 1969, the World Health Organization led an international malaria eradication campaign. It involved spraying DDT in as many houses and mosquito resting sites as possible, and setting-up information and evaluation systems to detect and treat malaria cases. Malaria eradication in Africa was not considered feasible in many areas because of the intensity of transmission and the limited health infrastructure to support the eradication programme. Pre-eradication activities were begun, instead, the main objectives being to analyse the malaria situation and the available means for its eradication and to provide assistance to promote training, develop institutions, improve administrative services, improve diagnostic and treatment services and to develop rural health services.

The eradication campaign proved successful in large areas of North America, Southern Europe, the former Soviet Union, the Middle East, and some territories of Asia and South America. Elsewhere, results varied and although malaria was reduced, areas of persistent transmission remained and were to become the source of epidemics. In 1964, in Sri Lanka for example, after completely eliminating the most dangerous of the malaria parasites, a lack of recognition of the importance of small-scale forest farming, and a relaxation of criteria and activities culminated in a massive epidemic in 1968. In 1969, the World Health Assembly resolved that the eradication campaign be abandoned in favour of prevention and control. Among the lessons learned, was that disease reduction must be adapted to local situations and maintained alongside simultaneous efforts for development of the health, agricultural, sanitation and economic systems. This did not occur in most malaria endemic tropical countries but, did in southern Europe and north Africa.

Prevention and Control

In the early 1970s, the international community, with the exception of WHO, let go of efforts to assist countries in their struggle against malaria. By the mid 1970s there was a major global resurgence of malaria, particularly in Asia. The largest, single most upsurge, occurred in India. Not only did malaria cases increase dramatically in Asia, but also parasite resistance to *chloroquine*, which was freely transmitted in the absence of well conducted and targeted mosquito control, became more intense and began to rapidly spread. Epidemics brought on a new scare that malaria was not slowing down, but rather on the move, and getting much stronger. The increasing volume of migration and flow of displaced populations as well as international travel helped towards this global upsurge, simply because people were moving from malaria-free into endemic countries and back. War, unplanned development and inadequate health structures and poor socio-economic conditions further aggravated the situation. In addition, increased mosquito resistance to insecticides and parasite resistance to antimalarial drugs, particularly in Southeast Asia and Latin America, complicated control efforts. All this came at a time when resources, by agencies and the countries themselves, had been withdrawn from malaria control, in favour of other seemingly more pressing problems.

During the 1980s WHO continued to promote, the development of antimalaria activities within the health care systems based on the principles of primary health care and the reorientation of eradication programmes. In 1983 the WHO Study Group on Malaria and Primary Health Care provided guid-

ance to countries for its accomplishment.. The WHO 18th and 19th Expert Committees on malaria meeting in 1985 and 1989 addressed the issues of an integrated approach to malaria control and monitored progress. Between 1990 and 1992, meetings of the Regional Task Forces on Malaria Control were held in Brasilia, Brazzaville, and New Delhi, from which the Global Malaria Control Strategy was developed and subsequently endorsed by the international community. Ninety percent of the countries have now adopted this Strategy.

The 1992 Ministerial Conference on Malaria in Amsterdam endorsed the global malaria control strategy calling for disease, rather than parasite-oriented control programmes to be implemented within primary health care. This calls for the strengthening of local and national capabilities for disease control, the building of community partnerships and the decentralization of decision-making with the involvement of public and private sectors. It also emphasizes the vital importance of continuing research, and of international teamwork in research and control.

It was not until the 1990s that the international community was re-awakened and the World Health Organization (WHO) was able to step-up efforts for malaria prevention and control. It was between 1992 - when 90 Ministers of Health ratified a Global Strategy for Malaria Control - and 1997, when WHO initiated an accelerated implementation of malaria control, in selected African countries, that malaria programmes in Africa finally picked up momentum.

Prevention and control efforts are tempered by unplanned development, war and poor socio-economic conditions.

The Global Malaria Control Strategy (Amsterdam 1992)

A Global Malaria Control Strategy was adopted in Amsterdam in 1992. It recognised that there is no single prescription for the control of malaria in all areas. The approaches have to be tailored to each unique epidemiological situation and based on the realistic assessment of control needs and risk factors. The strategy is flexible enough to allow the continuous assessment of local situations for appropriate and timely action.

The goal of malaria control, is to prevent mortality, reduce morbidity and social and economic losses by strengthening national capacity. "Capacity building" is understood to be the development of national competence to control tropical disease, by training personnel, developing appropriate policies, and providing the necessary supplies and accurate information. Four key elements include: early diagnosis and prompt treatment; planning and implementation of sustainable preventive measures and vector control; early detection, containment and prevention of epidemics; and regular reassessment of the ecological, social and economic determinants of the disease.

Action Plan (1995-2000)

- ❖ Sustained and strong political commitment;
- ❖ Integrated control, co-ordinated with health and non-health development programmes;
- ❖ Community co-operation in malaria control activities; and
- ❖ Adequate human and financial resources.

Objectives

- ❖ By the year 1997, appropriate malaria control programmes implemented in at least 90 percent of countries affected by malaria (objective achieved)
- ❖ By the year 2000, malaria mortality reduced by at least 20 percent, compared to 1995 data, in at least three-quarters of the endemic countries.

The Global Strategy already had a positive impact in many countries.



POLITICAL COMMITMENT

The global political commitment and drive behind post-war malaria control and malaria eradication was lost with the official declaration in 1969 to end the campaign, and has only really been regained comparatively recently. The turning point was the Ministerial Conference on Malaria held in Amsterdam in 1992 and the subsequent endorsement of the Global Strategy by the WHO Executive Board and the World Health Assembly in 1993, and by the United Nations General Assembly and its Economic and Social Council (ECOSOC) in 1994.

Building upon these political re-commitments and in response to the World Health Assembly, in 1996, urging Member States to participate fully in a re-established action programme, the Director-General of WHO provided US\$20 million for 1997 - 1998 for an accelerated malaria control programme in Africa. This has begun to lay a solid foundation for future action in Africa and the global commitment of WHO to "roll back malaria" in the years to come has already been indicated by the WHO Director-General elect.

In line with these accomplishments, in June 1997, in Harare, Zimbabwe, the Assembly of Heads of State and Government of the Organization of African Unity, issued a declaration on Malaria Prevention and Control in the Context of African Economic Recovery and Development. This was a major political step forward for commitment to malaria control in Africa, since the Assembly pledged to fully support the implementation of the global and regional strategies recommended by WHO. Moreover, the Assembly called upon member States to take immediate action and invited governments and other partners, including multilateral and bilateral agencies, to participate actively in a vigorous and coordinated effort.

During the Denver Summit meeting of the Eight held in June 1997, the Japanese Prime Minister proposed to include issues of parasitic diseases as an agenda item of the 1998 Summit meeting to be held in Birmingham, United Kingdom in May 1998. This initiative will bring the problem of malaria and its global control to the attention of senior ministers of these powerful countries and hopefully will elicit their support in a concerted action against this disease, especially in Africa.

A renewed political commitment, to the global control of this devastating disease, is now fully underway and beginning to become evident by the promise of increased activity and resources. At a meeting in November 1997 in Geneva, representatives of the United Nations, international and development agencies and of countries and experts involved in malaria control concluded that global coordination of action against malaria is vital for the more efficient use of scarce resources. The international community has a primary role to play not only in mobilizing these resources but in ensuring that national plans of action are fully supported.

Malaria requires relentless global political commitment, partnerships with community members, and a determined offensive.

CONTROL IN THE 1990s

The foundations were laid, for reducing the impact of malaria, with the adoption of the Global Strategy in 1992. An Action Plan, in 1995, set the course till the year 2000, giving priority to Sub-Saharan Africa. Key elements include country support and training and community involvement in prevention and control. The extra financing made available (\$20 million), towards malaria control, in 1997-1998, accelerated efforts in twenty-four countries in Africa. Additional funds, also in 1997, further assisted malaria efforts in countries affected by civil war including Angola, Burundi, Liberia and Sierra Leone.

By the end of 1997, over 90 percent of the malarious countries in the world were implementing appropriate malaria control programmes, thus achieving the Action Plan's foremost objective. In Africa, 47 of the 49 malaria endemic countries completed national plans of action for malaria control. Outside Africa, 57 countries reoriented their malaria control programmes in line with the Global Strategy. Malaria morbidity and mortality has been reduced in countries such as China, Solomon Islands, Philippines, Vanuatu, Viet Nam, Thailand, and parts of Ethiopia, some states of India, and Brazil. The malaria-free status for some countries in North Africa and in the Middle East, has also been maintained.

Control programmes most likely to achieve success are those that encompass the basic principles of the Global Strategy, delivered within national health systems. A government commitment to essential public health functions, combined with active community participation in programme implementation remain key to achieving sustained malaria control. Where all this has been achieved, the results have been remarkable.

The Solomon Islands in line with the Global Strategy

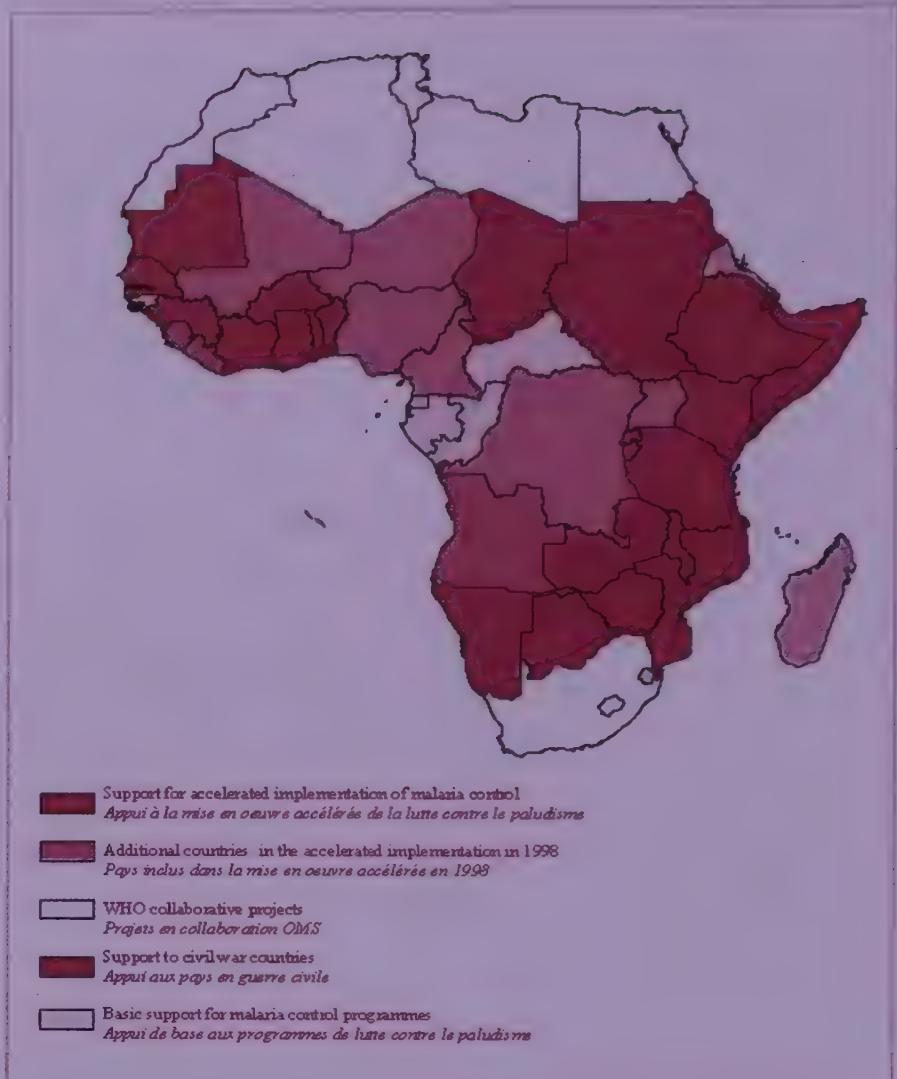
Since 1992, the Solomon Islands have reduced their malaria problem by 61 percent. It was the most malarious country outside of Africa, with an incidence of 440 per 1000 population. In 1997 the incidence went down to 170 per 1000 population. This was brought about by reorganization and reorientation of the programme in 1993 in line with the principles of the Global strategy's case management and the use of insecticide treated mosquito nets.

Control programmes most likely to achieve success are those that encompass the basic principles of the Global Strategy, delivered within the national health systems.

Financing

Financial support for malaria control has been largely insufficient particularly in sub-Saharan Africa. During the 1970s and 1980s, the international community had very little interest in funding malaria control activities. The expectation was that malaria would be automatically controlled through primary health care and that the investments being made in that new initiative would suffice especially in Africa. In addition, the expectation for a malaria vaccine further enhanced this notion. Despite continued efforts, on the part of WHO, to engage the international and development agencies to support malaria control, it was not until two years after the 1992 Amsterdam Conference on malaria that interest slowly began to be shown by some major agencies.

The most recent significant contribution to malaria control in Africa is the US \$20 million (for 1997-1998), made possible by the Director-General of the World Health Organization. Major financial assistance for malaria control has been gradually increasing in recent years and has been from national and international organizations, governmental and non-governmental organizations, development banks, and inter-governmental, bilateral and multilateral agencies. However, the contributions to malaria control remain insignificant considering the estimated economic loss of US\$2 billion



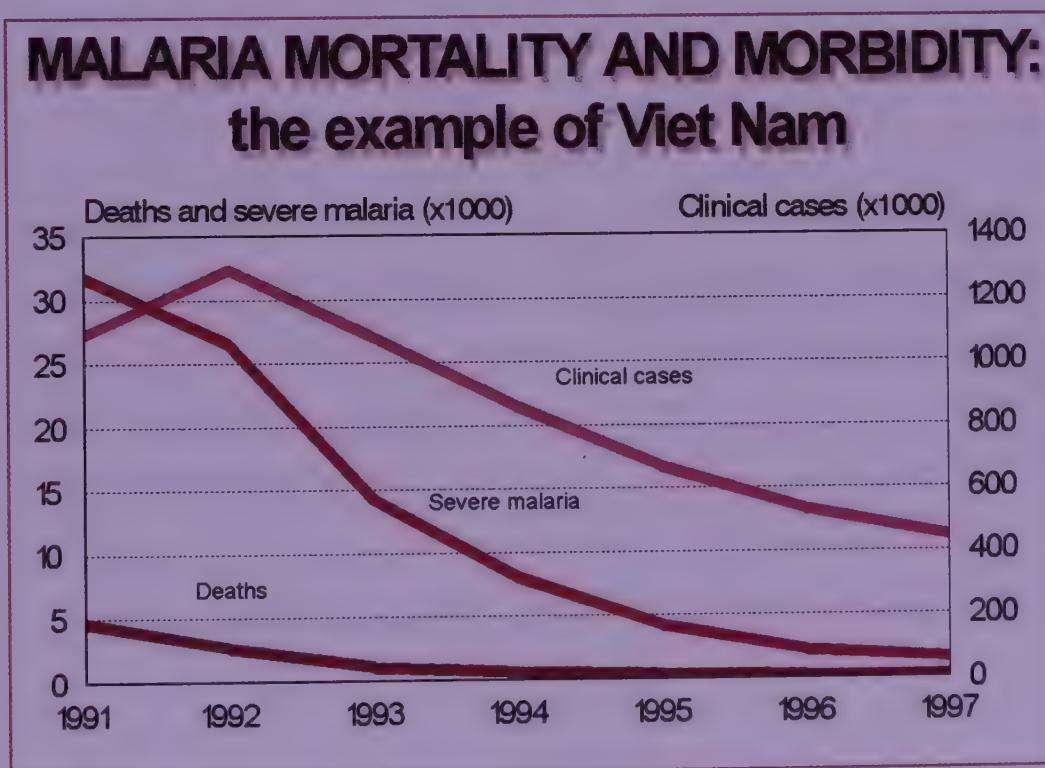
every year, in Africa alone. Whenever sufficient funds have been made available for malaria control programmes, considerable cost-savings have been achieved. Between 1989 and 1996, for example, Brazil's malaria control programme cost US\$616 million. It prevented however, 1,830,000 cases and over 100,000 deaths. The reduced incidence of malaria led to savings, on treatment costs alone estimated at US\$42.7 million.

24 Countries Benefiting from Accelerated Control Efforts

Benin	Botswana	Burkina Faso	Chad
Comoros	Côte d'Ivoire	Djibouti	Ethiopia
Gambia	Ghana	Guinea	Kenya
Malawi	Mauritania	Mozambique	Namibia
Rwanda	Senegal	Somalia	Sudan
Tanzania	Togo	Zambia	Zimbabwe

Locally Produced Antimalarial Drugs in Viet Nam

Malaria control in Viet Nam suffered severe setbacks in the 1980s because of general economic decline. Morbidity and mortality peaked in 1991 with 144 epidemics recorded. Health services had declined, DDT was no longer donated, resistance to antimalarials had developed, and people seeking new economic opportunities, in forest and hilly areas, carried the infection to previously malaria-free areas. In the early 1990s, however, financial support for malaria control, and locally produced Artemisinin - made possible through the collaboration of researchers and industry, combined with the provision and use of insecticide impregnated mosquito nets, greatly reduced the incidence of malaria and deaths. Government commitment has been important as has international cooperation, and the programme has benefited from rapid technological advances gained in other countries.



The financial contributions to malaria today, remain insignificant given the estimated economic losses.

Managing the Disease

There is no "quick fix" for the management of malarial disease for the world. But early diagnosis and prompt treatment - disease management - are fundamental to malaria control. Health ministries, to minimise mortality, morbidity and the development of drug resistance should take policy measures that are in line with the World Health Organization's policy guidelines for diagnosis and treatment of malaria. Children and pregnant women, on whom malaria has its greatest impact, are the most important target groups. All endemic countries need a national antimalarial drug policy. Such policies should take into account, the geographical distribution of the parasite, the response of patients to treatment with the available drugs, the quality of the drugs, the risks and benefits of the different drug regimens, and the level of health services available. The development of national antimalarial drug policies based on regular monitoring of drug efficacy is important, particularly because of the growing resistance of one of the most dangerous of the parasites, *P. falciparum*, to chloroquine and other antimalarials, as well as the side effects and high cost of the alternative drugs.

Immunization against malaria may become possible in the future. However at the present there is no vaccine available for malaria control and countries, communities and individuals must use the available tools in the most cost-effective manner. Programmes must be ready to incorporate much needed new tools and techniques as and when they become available. Disease prevention measures include community based targeted mosquito control, personal protection, and especially for pregnant women, the use of antimalarial drugs, (chemosuppression). Personal protection can be achieved through the use of protective clothing, repellents, house screening, and insecticide treated nets. Non-immune travellers, migrant labourers, soldiers, police and similar groups may be encouraged to take a combination of personal protection and preventive drugs. The use of antimalarial drugs for prevention is otherwise, no longer recommended for young children or the general public, except in special circumstances and for temporary use. The selective use of residual insecticide house spraying remains an important intervention measure especially in epidemic prone areas for epidemic prevention and control.

An Elaborate Surveillance System in Oman

From 1991 to 1997, Oman reduced its malaria incidence by at least 97 percent. In 1990 there were 37,220 laboratory confirmed cases of malaria in the country. In 1991 the malaria control programme was reorganized and an elaborate surveillance system was established. Despite extremely heavy rains in 1995, cases continued to fall. By 1997, only 129 locally contracted cases and 897 imported cases were detected in the entire country.

Insecticide-Treated Mosquito Nets

There are records that mosquito nets were used in the 6th century BC. They have been used for years as protection against nuisance insects, dust and roof debris and for privacy. Nets, curtains and clothing impregnated with insecticides were used during the Second World War to protect from malaria and other vector-borne diseases. DDT impregnated mosquito nets were also used for malaria control in the 1950s but were abandoned in favour of residual house spraying in the context of malaria eradication.

The potential usefulness of insecticide-treated mosquito nets for malaria control was reconsidered early in the 1980s with the advent of safe and photostable, synthetic pyrethroids. Large-scale use of pyrethroid treated mosquito nets has been a major part of the integrated approach to malaria control in the WHO Western Pacific Region (notably China) since the mid 1980s. Studies have since been carried out on the short-term efficacy of pyrethroid-treated nets on malaria vectors and diseases in many parts of the world. Large scale field trials in Africa, completed in 1996, have shown significant opportunities for the improvement of child survival. Appropriate use of insecticide treated mosquito nets can reduce mortality among children aged 1 - 4 years by 17 - 33 percent (average 25%) depending on the site.

Wherever insecticide treated nets have been appropriately and extensively used by populations in malaria endemic areas they have had an impact. This technology offers great hope as a complementary tool for the achievement of sustainable malaria control. To help in this process, a trial edition of the *Guidelines for the Implementation of Insecticide-Treated Mosquito Net Programmes for the Prevention and Control of Malaria in Africa* has been produced as a handbook. There are, however, many issues to be resolved including how best to deploy this method of personal protection in Africa and the place and effects of impregnated curtains and other materials in the home.

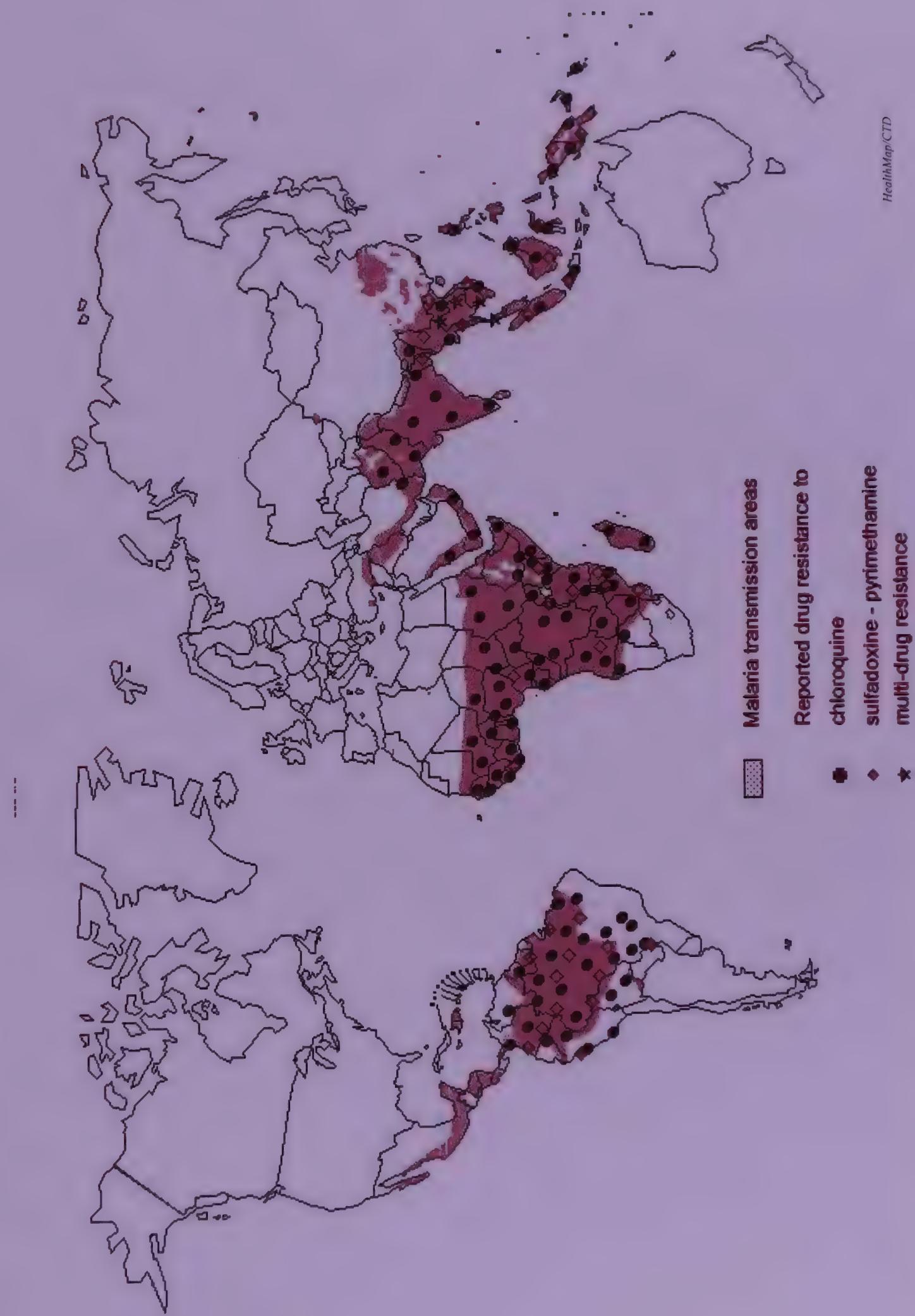
Parasite Resistance

Chloroquine continues to be the most effective, low cost and widely available antimalarial drug in many parts of the world especially Africa. However resistance of the malaria parasite to it, which was first recognized in Asia and Latin America in 1960, is now being increasingly demonstrated throughout the countries of Africa and most other areas of the world, with the exception of Central America where it has not yet occurred. Wherever it occurs, levels of *chloroquine* resistance are variable and although the parasite may show evidence of resistance to the drug, in many instances the clinical response in the patient is good.

Resistance to *sulfadoxine/pyrimethamine*, is also widespread in Southeast Asia and South America. But it remains one of the more suitable drugs for antenatal care, and if given intermittently, studies suggest that it may be effective protection against the adverse effects of *Plasmodium falciparum* on the fetus and mother. Approaches to the better management of the problem of malaria which is resistant to antimalarial drugs are being actively pursued.

Studies are also continuing on the better use of existing drugs through improved drug regimens and combinations. Among the more recent are studies on various formulations of *Artemisinin* and its derivatives for use in severe and non-severe malaria. This group of drugs is the only alternative, at present, for the management of severe forms of the disease.

MALARIA DISTRIBUTION 1997 AND REPORTED DRUG RESISTANCE



The WHO Pesticide Evaluation Scheme

The WHO Pesticide Evaluation Scheme (WHOPES) was set up in 1960 to test and evaluate new pesticides proposed for public health use and to collect, consolidate and disseminate information on pesticides and their use in vector control. Pesticides favourably evaluated in terms of safety, efficacy, ease of application, acceptance by residents, and cost-effectiveness provide standards for their quality, trade and use. These standards then become part of the International Code of Conduct on the Distribution and Use of Pesticides. In 1997, 16 insecticide products and three pesticide application machines were tested and evaluated with the collaboration of twenty institutions, in 16 countries.

WHOPES OBJECTIVES

- ◆ To help in the search for alternative safe and cost-effective pesticides;
- ◆ To make sure that pesticide products and formulations are adapted to local needs and conditions;
- ◆ To propagate WHOPES specifications for pesticides used in public health.

tion and ideas on issues related to the development and use of pesticides and pesticide application equipment within the context of WHO's global disease control strategies, and serves as an advisory and resource-mobilizing role to WHOPES. As of March 1998, 29 institutions have become members of this global collaboration, including participants from research institutions, regional and international organizations and pesticide and pesticide application equipment manufacturers.

THE IDEAL PESTICIDE

- ◆ Highly toxic to insects and other pests and minimally toxic to mammals, including humans
- ◆ Biologically degradable but persistent enough to be effective for long periods
- ◆ Easily and safely applied and transported
- ◆ Relatively inexpensive

WHOPES works with representatives of governments, the pesticide industry, WHO Collaborating Centres and university associations, associate laboratories, other WHO programmes and the International Programme on Chemical Safety. To strengthen WHOPES activities, and in order to facilitate the search for alternative pesticides and application methodologies that are safe and more cost-effective, WHOPES has recently established the Global Collaboration for Development of Pesticides for Public Health. This collaboration provides a forum for exchange of technical information and ideas on issues related to the development and use of pesticides and pesticide application equipment within the context of WHO's global disease control strategies, and serves as an advisory and resource-mobilizing role to WHOPES. As of March 1998, 29 institutions have become members of this global collaboration, including participants from research institutions, regional and international organizations and pesticide and pesticide application equipment manufacturers.

Community Participation

Community involvement is essential for sustainable malaria control. School malaria prevention programmes are a good example of how schools can make a major contribution to community health and increase the outreach of primary health care. An ambitious health programme for schoolchildren in Zanzibar, the United Republic of Tanzania, for example, uses an integrated approach to the control of malaria and intestinal worms. In Zimbabwe the Ministries of Education and of Health and Child Welfare have incorporated malaria prevention in the school health policy and programme. It is a cost-effective public health measure with important educational benefits given that, in highly malaria endemic areas, malaria impairs the learning capacity of between 35 percent and 60 percent of all school children. In the Solomon Islands chil-

dren lost 5.3 days of school each year while school absenteeism in Zimbabwe was as high as 28 percent.

In Africa progress is being made to establish malaria control programmes based on the global strategy. There are, however, alternate health care systems of traditional healers, medicine vendors and spiritual leaders who are often more accessible and affordable to the ordinary people. This has been recognized and WHO has produced, for those selling antimalarial drugs and providing other forms of treatment, a simple booklet in several languages about the treatment of malaria. In many areas, the formal health services need improvement to become the system of first choice by the general population.



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Community Based Malaria Control in India

In India, community-based projects have been launched in different settings. The first project was started in 1984, with fever surveillance and prompt radical treatment, followed by education on simple interventions. Other community activities since then, have included simple, feasible and impact-oriented projects, such as improving drainage, levelling ditches, planting eucalyptus and poplar trees in marshy areas, introducing fish into large village ponds and using insecticide treated mosquito nets. This experience in malaria control has completely transformed people's understanding about malaria. It confirmed that community participation is a rational and scientific approach to achieving sustainable malaria control with measurable and collateral benefits. In India, community participation has become the mainstay of planning and interventions, as local residents have been spurred on by the hope of freedom from the disease.

Community Based Malaria Control in Ethiopia

A community based programme was launched in 1992 in Tigray, northern Ethiopia. Objectives were to reduce morbidity and mortality, and to protect pregnant women from malaria. This six year old programme has had 714 volunteer community health workers serving a population of over 1.7 million living in over 2000 villages. It has had a remarkable impact. The mortality rate of children under five, as measured by surveys every two years, has fallen from 164 cases per thousand to 89.5 cases per thousand. The number of outpatients treated has also increased due to improved access to services. The volunteers are treating more than 70 percent of all clinical malaria outpatients in Tigray. Volunteer activities include diagnosis and treatment of clinical cases, referral of severe cases, provision of *chloroquine* prophylaxis to pregnant women, health education at the village level and promotion of personal protection measures. During the malaria transmission season, they mobilize the community weekly, and provide technical guidance for environmental management for malaria mosquito control.

Early diagnosis and prompt treatment in Thailand

The Royal Thai Government has long since recognized malaria as a priority communicable disease of public health and economic importance. For the past ten years, the government has fully funded its long-standing control programme. Malaria clinics were first established in 1975 along foothill, mountainous and border areas. Since, hundreds of clinics have been established throughout the country. This system of primary care clinics have provided to the population, free of charge, early diagnosis of malaria and prompt and appropriate treatment. This has contributed significantly to a marked reduction in malaria mortality and morbidity, with less than 75,000 cases detected in 1997, despite multi-drug resistance.

No Malaria in Egypt

Malaria was endemic in Egypt for centuries. During the building of the Suez Canal, the prevalence was 30 percent. The first Ministry of Health Malaria Control Unit was established in 1936 and has since developed into an efficient malaria control and surveillance service, which persists to this day. From 1959 to 1962 the parasite prevalence rate dropped to 20 percent and by early 1970 it had fallen to about 1 percent. During the period 1985 to 1995 the number of positive malaria cases fell to below 50 each year. Since 1993 no malaria cases have been reported except in one area, the Governorate of Fayoum. In 1996, a strong intersectoral initiative for passive and active screening of cases and vector control, involving the Ministries of Irrigation and Agriculture, took place. There were no cases of malaria during 1997 and none to date.

HOPE FOR TOMORROW

It is hoped that the renewed activity from the international donor community, during this decade, and particularly since 1997 will gain further momentum. Every year, up to 2.7 million people, around the world, die from malaria. The consequences of the disease are not only life threatening but also undermining the general health and welfare of families, debilitating the population and straining countries' and peoples' economic resources. For many countries, national budgets cannot cover the costs needed for malaria control and external funding is paramount. With a sufficient investment in malaria control, considerable social and economic benefits would be gained. The greater the resources, the more cost effective it would be in the long run. The accelerated malaria control programme started in 1997, by African countries, with the support of the World Health Organization, will be expanded and continued under the renewed political commitment.

Apart from the financial and human resources yet crucial to success, optimum use of existing resources and technology for control and research is needed. Today, there are new options for control and others are being developed. Individuals in malarious countries can protect themselves against mosquitos transmitting the disease, by using insecticide treated mosquito nets and repellents. There is steadily increasing knowledge about the parasite, new drugs, and potential vaccines. Nevertheless, research must continue.

The implementation of the Global Strategy is also beginning to have an impact in several countries, such as Brazil, China, Solomon Islands, Phil-

ippines, Vanuatu, Viet Nam and Thailand. The lesson is clear: malaria is being controlled using the tools currently available. The challenge is to apply these tools in the best possible way for the benefit of the vulnerable individuals and groups who are experiencing high levels of morbidity and mortality, particularly in sub-Saharan Africa. Nevertheless, there is still pressing need for new tools to be developed.

Already working with many partners from the private and public sector, including Ministries of Health, Industry, Non-Governmental Organizations and other United Nations Organizations, the World Health Organization hopes to mobilise even greater efforts to conquer malaria and its devastating and global consequences. Malaria is not the isolated concern of the health worker. It requires global political commitment and the partnership of community members, those engaged in education, the environment, water supply, sanitation and community development. Global warming, and its effects on the environment, increases the risk of malaria spreading into new areas, and necessitates a careful watch on the part of all sectors.

As once stated by M.F. Boyd, in 1939, "malaria control cannot be a campaign, it should be a policy, a long-term programme. It cannot be accomplished or maintained by spasmodic effort. It requires the adoption of a practicable programme with the reasonable continuity that will be sustained for a long time." Perhaps then, with the relentless tenacity needed, will there be due cause for hope that malaria will one day soon, cease to be a major public health problem.

MALARIA IS BEING TURNED AROUND IN AFRICA

The intensive action taken in 1997, by the African countries themselves, to control malaria, is unprecedented in the long history of the struggle against this disease. The Harare Declaration of the Heads of State and Government of the Organization of African Unity committed the countries to purge malaria from Africa; and WHO has rallied behind this determined drive. With this turn of events, the work, already started, is sure to make a significant impact, not only on malaria but, on the economy of the continent as a whole....



The World Health Organization's 50 years engagement with malaria is a complex story of action, lack of funds and missed opportunities. Malaria has daunted the international scientific community since man and mosquito have been together and has resisted many attempts at its containment. From eradication, to prevention and control and sustainable control, it remains by far the most widespread tropical parasitic disease, threatening at least 40 percent of the world's population. Children under the age of five, pregnant women, refugees and migrants are particularly vulnerable as are areas burdened with civil unrest and mass population movements.

But there is reason to believe that there is now the impetus for a renewed offensive against the disease. There are new options for control and others are being developed. There is steadily increasing knowledge about the parasite and vector, and new drugs and potential vaccines are in the pipeline. More importantly, the international community has re-awakened and funds are beginning to filter in slowly. It is hoped that by the year 2000, a 20 percent reduction in mortality is achieved in at least the majority of the endemic countries. Now, there is reason to believe that, with new scientific advances and increased political commitment and resources, the devastating effects of malaria can be turned around towards social and economic benefits.